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Monetary rules and sectoral unemployment in open economies

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ABSTRACT

A search-and-matching model of the labor market is incorporated into a small open economy model with nominal rigidities. This allows the behavior of tradable and nontradable sector unemployment rates to be studied under alternative monetary rules. An examination of dynamics in response to shocks to productivity, world prices and interest rates, and foreign demand suggests that monetary rules that respond to prices of domestic output rather than consumer prices may be better able to stabilize unemployment.

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1. Introduction

This paper integrates labor market search into a small open economy model and examines the implications of alternative monetary policy rules for unemployment in the tradable and nontradable goods sectors. The inclusion of labor market search allows for an analysis of the behavior of unemployment rates, which are a key observable variable of concern to policymakers and citizens. Furthermore, the model described below allows for heterogeneity between tradable and nontradable goods sectors. Examination of several simple monetary policy rules suggests that policies targeting prices of domestic output may be better able to stabilize unemployment than policies that focus on consumer prices. Domestic price inflation-based monetary rules are also shown to generate higher welfare.

This paper builds on a considerable literature analyzing monetary policy in open economy models with nominal rigidities and optimizing agents in the "New Open Economy Macroeconomics" tradition following Obstfeld and Rogoff (1995). This line of research represents an extension of the New Keynesian macroeconomic framework into an international setting. Entering an open economy setting raises several new issues for monetary policy, including whether policy should target consumer prices (which include imported goods prices) or prices of domestically-produced goods. The results below suggesting that policy rules focused on domestic prices may be superior in terms of stabilizing unemployment rates are complementary to Galí and Monacelli's (2005) conclusion that a policy rule responding to domestic prices generates higher welfare than one based on stabilizing consumer prices or the exchange rate. The results are also consistent with Svensson's (2000) finding that strict consumer price inflation targeting can generate higher volatility in other variables. Svensson finds that domestic inflation-based monetary rules are better at stabilizing the output gap, but does not explicitly consider unemployment rates.

Incorporation of labor market search addresses one of the major perceived weaknesses of standard dynamic general equilibrium macroeconomic models which is that they do not allow for involuntary unemployment. Merz (1995) and Andolfatto

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(1996) integrated labor market search into real business cycle (RBC) models. A number of studies have recently begun to combine labor market search and the New Keynesian macroeconomic framework. Among them, Walsh (2005) showed that the introduction of search and matching amplifies the real impact of an interest rate shock. Tang (2010) demonstrated that, in the presence of search externalities, complete inflation stabilization is not optimal. Trigari (2009) estimates structural parameters of a New Keynesian model with labor market search. Thomas (2008) shows that if wages are sticky, the standard New Keynesian "divine coincidence" between inflation and output stabilization no longer holds. This tradeoff faced by the monetary authority between inflation and output stabilization is explored by Blanchard and Galí (2010).

A small number recent papers have included labor market search in open economy models, but have not investigated alternative monetary policies. Schubert (2011) introduced labor market search into a real small-open economy model and examined dynamics in response to productivity and export shocks. Lama and Urrutia (2012) introduce separation costs and selection effects to examine the role of employment frictions. However, neither of those models have nominal rigidities, so they do not examine monetary policy. Christiano et al. (2011) incorporate search into a rich open-economy DSGE model which is estimated using Swedish data. While their model does include nominal rigidities, it is focused on an empirical investigation of the role of various factors in accounting for fluctuations. Zhang (2013) develops a similar model extended to consider tradable and nontradable goods sectors and estimates it for Canada. Both of those papers estimate parameters of an assumed Taylor-rule structure for monetary policy and do not investigate alternative policy rules.

The consideration of sectoral heterogeneity is motivated by the fact that reallocating labor between sectors can be very costly; for empirical evidence see Lee and Wolpin (2006). The fixed allocation of the labor force between traded and non-traded goods production assumed below can be thought of as a limiting case of the intersectoral adjustment costs examined in an open-economy setting by Craighead (2009) and Shi (2011). Under the assumption of intersectoral labor immobility, Craighead (2012) shows that monetary authorities face a tradeoff between stabilizing tradable and nontradable sector labor.

This paper contributes to the study of monetary policy in open economies by explicitly incorporating unemployment. The model is deliberately kept relatively simple in order to develop understanding of the mechanisms linking monetary policy, exchange rates and unemployment rates in response to various shocks. The concluding section discusses features which might be added in future research to enable the model to match empirical properties of small open economy behavior.

2. Model

2.1. Households

The model builds on that of Blanchard and Galí (2010), hereafter BG, by extending a version of it to an open economy with two intermediate goods production sectors. The "home" small open economy is represented by a household of unit measure, with members indexed by j, where a fraction s is allocated to the domestic tradable good sector (denoted D), and $1 - s$ is allocated to the nontradable good sector (N). The household receives utility from consumption and disutility from labor; its utility function is

$$U = E_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{C_t^{1-\sigma}}{1-\sigma} - \chi s \frac{\widetilde{L}_{D,t}^{1+\phi}}{1+\phi} - \chi(1-s) \frac{\widetilde{L}_{N,t}^{1+\phi}}{1+\phi} \right], \tag{1}$$

where $\widetilde{L}_{D,t}$ and $\widetilde{L}_{N,t}$ denote labor per worker in the D and N sectors. For each sector, total labor is the sum (integral) of labor supplied by the measure of the household membership in that sector;

$$L_{D,t} = \int_0^s \widetilde{L}_{D,t}(j)dj = s\widetilde{L}_{D,t} \qquad L_{N,t} = \int_s^1 \widetilde{L}_{N,t}(j)dj = (1-s)\widetilde{L}_{N,t}. \tag{2}$$

The consumption aggregate is a CES bundle of nontradable and tradable goods,

$$C_t = \left[(1-\omega)^{\frac{1}{\eta}} C_{N,t}^{\frac{\eta-1}{\eta}} + \omega^{\frac{1}{\eta}} C_{T,t}^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}}, \tag{3}$$

where η is the elasticity of substitution between tradable and nontradable goods and ω is a weighting parameter. Tradable goods consumption is comprised of both domestic and imported (M) goods,

$$C_{T,t} = \left[(1-\gamma)^{\frac{1}{v}} C_{M,t}^{\frac{v-1}{v}} + \gamma^{\frac{1}{v}} C_{D,t}^{\frac{v-1}{v}} \right]^{\frac{v}{v-1}}, \tag{4}$$

where v is the elasticity of substitution between home and foreign tradables, and γ is a weighting parameter that represents the degree of "home bias" in consumption. The corresponding price indexes are given by

$$P_t = \left[(1-\omega)P_{N,t}^{1-\eta} + \omega P_{T,t}^{1-\eta} \right]^{\frac{1}{1-\eta}} \tag{5}$$

and

$$P_{T,t} = \left[(1-\gamma)P_{M,t}^{1-v} + \gamma P_{D,t}^{1-v} \right]^{\frac{1}{1-v}}, \tag{6}$$